North Seattle Community College

Math Pre-Tests Summary

Winter 2011

**Objective:** The faculty was interested in assessing how well students retained the concepts learned in their prior prerequisite math course.

**Process**: Fall quarter 2010, the faculty developed a pre-test for each of the following 3 courses: MATH084/MATH097, MATH098, MATH116/MATH141. During winter quarter 2011, all faculty who were teaching any of these courses, were asked to administer the pre-test in their class during the first week of the quarter. Each faculty member graded their students’ pre-tests and then turned them in so the data could be compiled. Information identifying a specific student or instructor was not included in the compilation of the data.

**Findings:**MATH084- Algebra I:

* MATH084 - 6 sections (2 were computer-based) out of 9 sections offered.
* 148 students total participated (34 are in the 2 computer-based sections; 114 were in 4 traditional sections)
* Prerequisite: MATH081 – Basic Math Skills
* 10 question test. **Average score: 5.20 questions correct**. **(52%)**

Following is the number of students out of 148 (and percentage) who missed each question. Questions that over 50% of the students missed are highlighted.

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10

32 85 46 107 122 95 26 24 74 100

21.62% **57.43**% 31.08% **72.30%** **82.43%** **64.19%** 17.57% 16.22% 50.00% **67.57%**

**Question:** **Description:**

Q1 Rounding

Q2 **Square Root using a Fraction**

Q3 Order of Operation-Whole Numbers

Q4 **Multiply Fractions**

Q5 **Divide Fractions**

Q6 **Order of Operation-Fractions**

Q7 Add Decimals

Q8 Multiply Signed Numbers

Q9 Subtract Signed Numbers

Q10 **Convert Fraction to Percent**

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| How Prereq. Was Met | Total Num. Students | Questions that >50% of students missed |
| Took MATH081 | 59 | Q4, Q5, Q9, Q10 |
| Placement Test | 83 | Q2, Q4, Q, Q5, Q6, Q10 |
| Transferred in Prereq. | 5 | Q2, Q4, Q5, Q6 |
| Unknown | 1 | Q1, Q2, Q3, Q5, Q6, Q9 |

**Observation**: Students who took MATH081 performed generally as well or better on all questions except for question #9 – Subtracting Signed Numbers. (Please see next page.)

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| **MATH084 - Percentage of students who missed each question** | | | | | | | | | | | |
| **Pathway Value** | **Number  of Students** | **Percent Q1** | **Percent Q2** | **Percent Q3** | **Percent Q4** | **Percent Q5** | **Percent Q6** | **Percent Q7** | **Percent Q8** | **Percent Q9** | **Percent Q10** |
| Completed Math Prereq Course | 59 | 22.03% | 37.29% | 25.42% | 61.02% | 72.88% | 47.46% | 20.34% | 18.64% | 61.02% | 64.41% |
| Placement Test | 83 | 19.28% | 71.08% | 34.94% | 81.93% | 89.16% | 75.90% | 14.46% | 14.46% | 42.17% | 73.49% |
| Transferred | 5 | 40.00% | 60.00% | 20.00% | 60.00% | 80.00% | 60.00% | 40.00% | 20.00% | 40.00% | 20.00% |
| Unknown | 1 | 100.00% | 100.00% | 100.00% | 0.00% | 100.00% | 100.00% | 0.00% | 0.00% | 100.00% | 0.00% |

MATH097 –Elementary Algebra:

* 0 out of 2 sections

MATH098 – Intermediate Algebra

* 4 sections (2 were computer-based) out of 7 sections offered.
* 82 students in total participated (15 are in computer-based sections; 67 were in traditional sections)
* Prerequisite: MATH085/MAT097 – Algebra II
* 8 question test. **Average score: 3.4 questions correct**. **(42.5%)**

Number of Students out of 82 (and Percentage) who missed each question:

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8

27 25 46 43 58 48 70 63

32.93% 30.49% **56.10%** **52.44%** **70.73%** **58.54%** **85.37%** **76.83%**

Question: Description:

Q1 Simplify a polynomial expression

Q2 Find the square of a binomial

Q3 **Solve a rationale equation**

Q4 **Solve a quadratic equation**

Q5 **Solve an inequality**

Q6 **Given an equation, find the slope and Y-intercept**

Q7 **Find the equation given two points**

Q8 **Solve a system of linear equations**

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| How Prereq. Was Met | Total Num. Students | Questions that >50% of students missed |
| Took M ATH085/097 | 61 | Q3, Q5, Q7, Q8 |
| Placement Test | 14 | Q1, Q3, Q4, Q5, Q6, Q7, A8 |
| Transferred in Prereq. | 6 | Q3, Q5, Q6, Q7, Q8 |
| Unknown | 1 | Q3, Q4, Q5, Q6, Q7, Q8 |

**Observation**: Students who completed our prerequisite course (MATH085/097) tended to perform better on the pre-test than those who were placed in the class via the placement test. (Please see next page.)

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| **MATH098 – Percentage of Students who missed each question** | | | | | | | | | |
| **Pathway Value** | **Number of Students** | **Percent Q1** | **Percent Q2** | **Percent Q3** | **Percent Q4** | **Percent Q5** | **Percent Q6** | **Percent Q7** | **Percent Q8** |
| Completed Math Prereq Course | 61 | 29.51% | 27.87% | 54.10% | 45.90% | 62.30% | 49.18% | 83.61% | 77.05% |
| Placement Test | 14 | 57.14% | 35.71% | 57.14% | 78.57% | 92.86% | 85.71% | 92.86% | 71.43% |
| Transferred | 6 | 16.67% | 50.00% | 66.67% | 50.00% | 100.00% | 83.33% | 83.33% | 83.33% |
| Unknown | 1 | 0.00% | 0.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

MATH116 – Applied Math to Management, Life & Social Science

* 2 sections (both traditional) out of 2 sections offered.
* 58 students in total. All are in traditional sections
* Prerequisite: MATH098 – Intermediate Algebra
* 10 question test. **Average score: 3.0 questions correct**. **(30%)**

Number of Students out of 58 (and Percentage) who missed each question:

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10

46 43 47 46 39 47 22 45 34 39

**79.31%** **74.14%** **81.03%** **79.31%** **67.24%** **81.03%** 37.93% **77.59%** **58.62%** **67.24%**

Question Description

Q1 **Given an equation, identify Slope and graph equation**

Q2 **Given a line, find the slope and determine the equation**

Q3 **Simplify A Rationale Expression**

Q4 **Solve an equation for a variable: i.e solve for R: D=RT**

Q5 **Solve an equation for a variable (when variable is in denominator)**

Q6 **Solve a quadratic equation**

Q7 Function. Given a function, determine f(-5)

Q8 **Re-write log in exponential form**

Q9 **Re-write a radical in exponential form**

Q10 **Re-write expression without negative exponents**

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| How Prereq. Was Met | Total Num. Students | Questions that >50% of students missed |
| Took MATH098 | 20 | All ten questions \* |
| Placement Test | 28 | All questions except Q7 and Q9 |
| Transferred in Prereq. | 2 | All ten questions |
| Unknown | 8 | All questions except Q5 & Q7 \*\* |

**Observations**:

\* The percentage of questions missed for students who completed our prerequisite class (MATH098) was noticeably higher (i.e. worse) on the pre-test than for those who were placed in the class via the placement test. (Please see next page.)

\*\* The percentage of students who missed each question was a bit lower (i.e. they performed a bit better) for the “Unknown” students compared to those who took the prereq. course. (Please see next page.)

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| **MATH116 – Percentage of students who missed each question** | | | | | | | | | | | |
| **Pathway Value** | **Number  of Students** | **Percent Q1** | **Percent Q2** | **Percent Q3** | **Percent Q4** | **Percent Q5** | **Percent Q6** | **Percent Q7** | **Percent Q8** | **Percent Q9** | **Percent Q10** |
| Completed Math Prereq Course | 20 | 75.00% | 75.00% | 95.00% | 100.00% | 90.00% | 95.00% | 55.00% | 85.00% | 75.00% | 75.00% |
| Placement Test | 28 | 82.14% | 67.86% | 67.86% | 67.86% | 57.14% | 75.00% | 28.57% | 75.00% | 39.29% | 60.71% |
| Transferred | 2 | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Unknown | 8 | 75.00% | 87.50% | 87.50% | 62.50% | 37.50% | 62.50% | 12.50% | 62.50% | 75.00% | 62.50% |

MATH141 – Pre-Calculus I

* 3 sections (all traditional) out of 4 sections offered.
* 95 students total. All in traditional sections.
* Prerequisite: MATH098 – Intermediate Algebra
* 10 question test. **Average score: 3.5 questions correct**. **(35%)**

Number of Students out of 95 (and Percentage) who missed each question:

Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10

36 58 83 72 68 78 28 78 54 62

37.89% **61.05%** **87.37%** **75.79%** **71.58%** **82.11%** 29.47% **82.11%** **56.84%** **65.26%**

Question Description

Q1 Given an equation, identify Slope and graph equation

Q2 **Given a line, find the slope and determine the equation**

Q3 **Simplify A Rationale Expression**

Q4 **Solve an equation for a variable: i.e solve for R: D=RT**

Q5 **Solve an equation for a variable (when variable is in denominator)**

Q6 **Solve a quadratic equation**

Q7 Function. Given a function, determine f(-5)

Q8 **Re-write log in exponential form**

Q9 **Re-write a radical in exponential form**

Q10 **Re-write expression without negative exponents**

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| --- | --- | --- |
| How Prereq. Was Met | Total Num. Students | Questions that >50% of students missed |
| Took MATH098 | 35 | All questions except Q1 and Q7 |
| Placement Test | 49 | All questions except Q1 and Q7 \* |
| Transferred in Prereq. | 9 | All questions except Q1 and Q7 |
| Unknown | 2 | Q3, Q5, Q6, Q8, Q9 |

**Observation**:

\* The percentage of students who missed each question was slightly higher (i.e.worse) for those who took the placement test compared to those who took the prereq. class. (Please see next page.)

\*\* Performance overall on the pre-test was fairly consistent (the majority had difficulty with all questions except Q1 and Q7) regardless of how the prereq. was met. (Please see above.)

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| **MATH141- Percentage of students that missed each question** | | | | | | | | | | | |
| **Pathway Value** | **Number  of Students** | **Percent Q1** | **Percent Q2** | **Percent Q3** | **Percent Q4** | **Percent Q5** | **Percent Q6** | **Percent Q7** | **Percent Q8** | **Percent Q9** | **Percent Q10** |
| Completed Math Prereq Course | 35 | 48.57% | 57.14% | 82.86% | 65.71% | 68.57% | 68.57% | 20.00% | 74.29% | 54.29% | 51.43% |
| Placement Test | 49 | 30.61% | 63.27% | 91.84% | 85.71% | 73.47% | 91.84% | 34.69% | 87.76% | 57.14% | 77.55% |
| Transferred | 9 | 33.33% | 66.67% | 77.78% | 66.67% | 66.67% | 77.78% | 44.44% | 77.78% | 55.56% | 55.56% |
| Unknown | 2 | 50.00% | 50.00% | 100.00% | 50.00% | 100.00% | 100.00% | 0.00% | 100.00% | 100.00% | 50.00% |

**Next Steps:**

Faculty will discuss the results and determine what they’d like to do next.

Some possibilities:  
1. Create review packets for students to use to review concepts before the first day of class.   
2. As a group, choose a topic or two to focus on in each class where students under-performed, then administer pre-tests again in a future quarter to assess any improvement.  
3. Isolate students who took HDC linked course to see if their retention rates were higher than other students who were not in the HDC linked course. (Need to do in a future quarter. Spring for MATH084/097?)  
4. Gather data for MATH097 to determine whether students were better prepared for that course than they are for MATH084.

**Notes on Reflection Friday Discussion:**

1. Suggestion: Modify the MATH098 pre-test next time and break out MATH085/MATH097 in the “How the prereq. was met”
2. Suggestion: Consensus was to administer the pre-test during the middle of week #1 of the quarter. In Winter 2011, some administered it the first day of the quarter, others during the second week.
3. Suggestion related to #2: Inform students in advanced (on first two days of the quarter) that they’ll be taking a pre-test on Wednesday (mid-week).
4. Suggestion related to #2: To help students retain their prereq. math knowledge, the math dept. could create “Preparation Packets”. Students could be given that packet at the completion of the prereq. course with the request to review prior to the beginning of their next math course. Students who placed into a math course via the placement test could be given the packet to review prior to beginning the math course in which they were placed.
5. Discussion Point: Faculty wondered why students can perform successfully on a final exam but two weeks later are unable to perform a similar (or in some cases identical) problems. Faculty noted that this may be due to the fact that students may have a superficial (not deep) understanding of the concept. Faculty discussed the use the resource bank as a way to deepen understanding. This is an area we may want to do a future assessment in (i.e. comparing completion rates (Jerry Woodard data) or concept retention rates (via math pre-tests) for students who took a class in which resource bank questions were used vs. those who didn’t. May also want to do a future assessment to determine completion rates (Jerry Woodard data) and/or concept retention rates (math pre-tests) for students who took an HDC or MATH089 linked courses compared to students who didn’t take a linked course.
6. Discussion Point: Faculty noted that students who did well on the pre-test tended to be successful in the class. But the reverse was not always true. Some students who did poorly on the pre-test ended up being successful in the class. Suggestion: Perform a “CAT” to find out what strategies students used that they felt contributed to their success in the class. Would also be interesting to assess how well they did on the next math class pre-test. (i.e. Did the actions they took really “fix” the holes in their understanding or did it “just get them through” the class.